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KIT WHICH IS INTENDED TO BE IMPLANTED IN A BLOOD VESSEL, AND ASSOCIATED TUBULAR ENDOPROSTHESIS

BACKGROUND OF THE INVENTION

I. Technical Field

The present invention relates to a kit which is intended to be implanted in a blood vessel, of the type comprising a tubular endoprosthesis which has an inner surface which delimits a channel having a longitudinal axis; and a prosthetic valve which is intended to be implanted in the channel, the valve comprising a carrier reinforcement which has an outer surface which is intended to be pressed against the inner surface of the endoprosthesis, the reinforcement being able to be deformed radially from a folded position for placement to a deployed position for implantation; a flexible shutter which is connected to the reinforcement and which can be deformed between a blocking position in which it is extended transversely and a release position in which it is contracted transversely under the action of the flow moving in the channel.

II. Description of Related Art

From EP-A-0 850 607, a kit of the above-mentioned type is known which comprises a tubular endoprosthesis and a prosthetic valve which has a deformable carrier reinforcement and a flexible shutter which is fixed to the reinforcement.

A kit of this type is intended to be implanted in place of a valve in a blood vessel.

Valves of this type are, for example, present in the heart, between the auricles and the ventricles, or at the outlet of the right ventricle and the left ventricle. These valves ensure one-way circulation of the blood flow, preventing blood reflux following the ventricular contraction.

In order to carry out a valve replacement, the tubular endoprosthesis provided in the kit is implanted in the portion of the vessel in which the defective valve is located. Then, the prosthetic valve in the folded state thereof is moved into the inner channel delimited by the endoprosthesis and is pressed against this endoprosthesis by inflating a balloon.

A device of this type is not entirely satisfactory. The relative positioning of the prosthetic valve relative to the endoprosthesis is approximate and the fixing of the valve in the endoprosthesis is not very secure.

SUMMARY OF THE INVENTION

An object of the invention is therefore to provide a kit of the above-mentioned type which allows the successive implantation of a tubular endoprosthesis in a human blood vessel, then a prosthetic valve in the endoprosthesis so that the positioning of the prosthetic valve in the endoprosthesis is straightforward and secure.

To this end, the invention relates to a kit of the above-mentioned type, characterized in that at least one of the inner and outer surfaces has at least two portions having a variable cross-section along the longitudinal axis, the portions forming a proximal stop and a distal stop, respectively, to block the axial displacement of the outer surface along the inner surface in two opposing directions.

The kit according to the invention may comprise one or more of the following features, taken in isolation or according to any technically possible combination, the two portions having a variable cross-section over one of the surfaces form at least a fixing portion which protrudes radially, the fixing portion which protrudes radially being intended to be received in a corresponding hole which is provided in the other one of the surfaces, the other one of the surfaces has at

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least two portions having a variable cross-section along the longitudinal axis, the portions delimiting, in the other one of the surfaces, a housing for receiving the or each protruding portion, having a shape which complements that of the or each protruding portion, one of the surfaces delimits at least two protruding portions which are spaced-apart along the longitudinal axis, the or each protruding portion delimits two angular stop surfaces in order to block the rotation of the outer surface along the inner surface around the longitudinal axis, one of the surfaces delimits at least two protruding portions which are spaced-apart in an angular manner around the longitudinal axis, the inner surface has two portions which have a variable cross-section and which are connected to each other by means of a support portion which is radially recessed, the support portion having a length which is substantially equal to the length of the outer surface provided on the carrier reinforcement and delimiting, with the portions having a variable cross-section, a housing for receiving the carrier reinforcement, the two portions having a variable cross-section are delimited by two annular contractions which protrude in the channel and the portions having a variable cross-section are radio-opaque.

The invention also relates to a tubular endoprosthesis, of the type having an inner surface which delimits a channel having a longitudinal axis,

characterized in that the inner surface has at least two portions which have a variable cross-section along the longitudinal axis, the portions forming a proximal stop and a distal stop, respectively, to block the axial displacement in two opposing directions of an outer surface provided on a prosthetic valve which is intended to be implanted on the inner surface in the channel.

Finally, the invention relates to a prosthetic valve which is intended to be implanted in a channel of a tubular endoprosthesis, comprising a carrier reinforcement which has an outer surface which is intended to be pressed against the inner surface of the endoprosthesis, the reinforcement being able to be radially deformed from a folded position for placement to a deployed position for implantation, a flexible shutter which is connected to the reinforcement and which can be deformed between a blocking position in which it is extended transversely and a release position in which it is contracted transversely under the action of the flow moving in the channel, characterized in that the outer surface of the carrier reinforcement has at least two portions having a variable cross-section along the longitudinal axis, the portions forming a proximal stop and a distal stop, respectively, to block the axial displacement of the valve relative to the tubular endoprosthesis.

BRIEF DESCRIPTION OF DRAWINGS

The invention will be better understood from a reading of the following description, given purely by way of example, and with reference to the appended drawings, in which:

FIG. 1 is a plan view of a first kit according to the invention;

FIG. 2 is a cross-section of the first kit according to the invention implanted in a blood vessel;

FIG. 3 is a view similar to FIG. 2 of a second kit according to the invention;

FIG. 4 is a view similar to FIG. 2 of a third kit according to the invention;

FIG. 5 is a perspective view of a valve of a fourth kit according to the invention; and

FIG. 6 is a section along a transverse plane of the fourth kit according to the invention, implanted in a blood vessel.

DETAILED DESCRIPTION OF THE INVENTION

A first kit according to the invention is illustrated in FIGS. 1 and 2.